

September 15, 2017

Mr. Anthony Krone Risk Manager Shelby County Schools 160 South Hollywood – Room 152 Memphis, Tennessee 38112

RE: Lead in Drinking Water Sampling Oakhaven Middle & High School 3125 Ladbrook Road Memphis, Tennessee Tioga Project No.: 24816.01

Dear Mr. Krone,

At the request of Shelby County Schools (the Client), Tioga Environmental Consultants (Tioga) performed sampling of drinking water sources at Oakhaven Middle & High School for laboratory analysis of total lead concentrations.

As preliminary sampling of select water sources at this school revealed the potential for elevated lead levels in the potable water system, Tioga recommended additional sampling of all water fountains in the school to determine the extent of the issue. Following the receipt of the laboratory analytical results from the initial sampling event, Tioga informed Shelby County Schools Risk Management personnel, who instructed maintenance personnel to take the water fountains at this school out of service pending further testing.

Prior to this additional sampling event, the water fountains throughout the school had been shut off for approximately four days. Sampling was conducted early in the morning, before any potable water sources had been used for the day and prior to the arrival of any students or faculty. Maintenance personnel reactivated the water fountains immediately prior to sampling, and the water fountains were deactivated and taken out of service immediately following the sampling.

On September 12, 2017, Tioga representative Margaret Strom arrived onsite and was escorted through the building by Shelby County Schools personnel. First-draw potable water samples were collected in accordance with the Environmental Protection Agency (EPA) regulations codified in 40 CFR 141.86, and were documented and transferred under chain-of-custody protocol to Waypoint Analytical Laboratories in Memphis, Tennessee for analysis of total lead content.

The EPA has established an action level for public water supply systems at 15 micrograms of lead per liter of water (15 μ g/L). The further EPA recommends that schools remove water fountains and other outlets used for consumption if lead levels exceed 20 μ g/L. Though this school uses water from the municipal water supply and therefore does not qualify as a public water supply system, Tioga recommends that the more conservative EPA action level of 15 μ g/L be used in the decision making process as to the continued operation of the potable water sources at the school.

Results Based on Laboratory Analysis:

Table 1 below summarizes the sampling locations, laboratory analytical results, and EPA action level for lead in drinking water. Sample results with a "<" symbol did not contain lead content above the laboratory detection limit. Samples highlighted in yellow exceeded the EPA action level for lead.

Table 1
Summary of Analytical Results
Oakhaven Middle & High School
September 12, 2017

Sample ID	Sample Location	Total Lead (µg/L)	EPA Action Level (µg/L)
31-1	High School – Water Fountain Across from Room 219	5550	
31-2	Middle School – Water Fountain Across from Room 223	47.6	
31-3	Middle School – Water Fountain Near Room 224	26.1	
31-4	High School – Water Fountain Across from Room 218	89.0	
31-5	High School – Water Fountain Across from Room 214	2290	
31-6	High School – Water Fountain Across from Room 212	822	
31-7	High School – Water Fountain Near Room 210	13.6	
31-8	High School – Water Fountain Across from Room 208	1.75	
31-9	High School – Water Fountain Across from Room 113	1270	
31-10	High School – Water Fountain Across from Room 120	18.1	
31-11	Middle School – Water Fountain Across from Room 126	364	
31-12	Middle School – Water Fountain Near Room 121	1.05	15
31-13	Cafeteria Water Fountain	86.8	13
31-14	Vocational / Band Water Fountain	57.2	
31-15	ROTC Water Fountain	8.98	
31-16	High School – Gym Water Fountain	6.87	
31-17	Water Fountain in Football Locker Room	<0.513	
31-18	Middle School – Gym Water Fountain	1.59	
31-19	High School – Auditorium Double Water Fountain	7.29	
31-20	High School – Auditorium Single Water Fountain	592	
31-21	Elementary – Water Fountain Near Room 101 (Bubbler)	58.1	
31-22	Elementary – Tall Water Fountain Near Room 101	0.558	
31-23	Elementary – Water Fountain Near Room 203 (Bubbler)	0.859	
31-24	Elementary – Cafeteria Water Fountain	0.909	

 $(\mu g/L)$ = Micrograms of lead per liter of water (parts per billion)

A review of the laboratory analytical results of the water samples collected revealed thirteen samples with total lead concentrations above the EPA action level for drinking water. The water fountains in the high school across from rooms 103 and 203 were not functional, therefore no sample was collected from these fountains.

Shelby County Schools Drinking Water Sampling Oakhaven Middle & High School September 15, 2017

Recommendations:

Based upon the laboratory analytical results of the potable water samples collected from Oakhaven Middle & High School, Tioga recommends that the water sources above the EPA action level remain out of use.

The EPA provides technical guidance for reducing lead in drinking water in schools published in the October 2006 revision of the "3Ts for Reducing Lead in Drinking Water in Schools". Tioga recommends that a plan be developed and implemented in accordance with this guidance with additional testing to identify potential sources of lead in this school and to remediate these sources as they are identified. As the next step in determining the sources of lead contamination, Tioga recommends follow-up post-flush testing for water sources that exceeded the EPA action level.

Limitations

Potable water sources with elevated lead levels may potentially be present in areas of the property that are not addressed with this report. This investigation only included the potable water sources specifically addressed.

We appreciate the opportunity to provide you with this service. Should you have any questions regarding this report, please contact me at (901) 791-2432.

Sincerely,

TIOGA ENVIRONMENTAL CONSULTANTS, INC.

Eric Davis, CIE

Environmental Scientist

Enclosure: (1) Laboratory Analytical Report



9/14/2017

Tioga Environmental Consultants Mr. Luke Hall 357 North Main Street Memphis, TN, 38103

Ref: **Analytical Testing**

> Lab Report Number: 17-255-0249 Client Project Description: 31-All

Project #24816.01

Dear Mr. Luke Hall:

Waypoint Analytical, Inc. received sample(s) on 9/12/2017 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in accordance with the applicable analytical method.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2012) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance.

The results are shown on the attached Report of Analysis(s). Results for solid matrices are reported on an asreceived basis unless otherwise indicated. This report shall not be reproduced except in full and relates only to the samples included in this report.

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

Randy Thomas **Project Manager**

Rendell H. Thomas

Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the

analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis.

Texas



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Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No: 91788 Matrix: Aqueous

Sample ID : **31-1** Sampled: **9/12/2017 5:50**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 5550 μg/L 0.500 1 09/14/17 13:13 BKN EPA-200.8

Lab No: 91789 Matrix: Aqueous

Sample ID: **31-2** Sampled: **9/12/2017 5:55**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 47.6 μg/L 0.513 1 09/13/17 23:37 BKN

Lab No: 91790 Matrix: Aqueous

Sample ID: **31-3** Sampled: **9/12/2017 5:58**

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 26.1 μg/L 0.513 1 09/13/17 23:48 BKN

Lab No: 91791 Matrix: Aqueous

Sampled: **9/12/2017 6:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	89.0	μg/L	0.500	1	09/14/17 13:17	BKN	EPA-200.8	

Qualifiers/ Definitions

DF

Dilution Factor

MQL



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Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No : 91792 Matrix: Aqueous

Sample ID : **31-5** Sampled: **9/12/2017 6:03**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 2290 μg/L 0.500 1 09/14/17 13:22 BKN EPA-200.8

Lab No : 91793 Matrix: Aqueous

Sample ID : **31-6** Sampled: **9/12/2017 6:05**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 822 μg/L 0.500 1 09/14/17 13:27 BKN

Lab No: 91794 Matrix: Aqueous

Sample ID: **31-7** Sampled: **9/12/2017 6:14**

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 13.6 μg/L 0.513 1 09/13/17 23:53 BKN

Lab No: 91795 Matrix: Aqueous

Sampled: 9/12/2017 6:20

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	1.75	μg/L	0.513	1	09/13/17 23:58	BKN	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL



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Total Lead

Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

EPA-200.8

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No: 91796 Matrix: Aqueous

Sample ID : **31-9** Sampled: **9/12/2017 6:24**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 1270 μg/L 0.500 1 09/14/17 13:32 BKN EPA-200.8

Lab No: 91797 Matrix: Aqueous

Sample ID : **31-10** Sampled: **9/12/2017 6:25**

Test Results Units MQL DF Date / Time By Analytical Analyzed Method

0.513

Lab No : 91798 Matrix: Aqueous

μg/L

18.1

Sample ID: **31-11** Sampled: **9/12/2017 6:28**

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 364 μg/L 0.513 1 09/14/17 00:08 BKN

Lab No: 91799 Matrix: Aqueous

Sampled: **9/12/2017 6:30**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	1.05	μg/L	0.513	1	09/14/17 00:13	BKN	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL

Method Quantitation Limit

1 09/14/17 00:03 BKN



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Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No: 91800 Matrix: Aqueous

Sample ID : **31-13** Sampled: **9/12/2017 6:35**

Test Results Units MQL DF Date / Time By Analytical **Analyzed** Method Total Lead 86.8 μg/L 0.500 1 09/14/17 13:37 BKN EPA-200.8

Lab No: 91801 Matrix: Aqueous

Sample ID: **31-14** Sampled: **9/12/2017 6:37**

DF Units MQL Date / Time Test Results Ву Analytical Analyzed Method Total Lead EPA-200.8 57.2 μg/L 0.513 1 09/14/17 00:18 BKN

Lab No : 91802 Matrix: Aqueous

Sample ID: **31-15** Sampled: **9/12/2017 6:40**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	8.98	μg/L	0.513	1	09/14/17 00:23	BKN	EPA-200.8	

Lab No: 91803 Matrix: Aqueous

Sampled: **9/12/2017 6:45**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	6.87	μg/L	0.513	1	09/14/17 00:28	BKN	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL



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Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No : 91804 Matrix: Aqueous

Sample ID : **31-17** Sampled: **9/12/2017 6:50**

Test Results Units MQL DF Date / Time By Analytical **Analyzed** Method Total Lead < 0.513 μg/L 0.513 1 09/14/17 00:33 BKN EPA-200.8

Lab No: 91805 Matrix: Aqueous

Sample ID: **31-18** Sampled: **9/12/2017 7:10**

DF Units MQL Date / Time Test Results Ву Analytical Analyzed Method Total Lead EPA-200.8 1.59 μg/L 0.513 1 09/14/17 00:45 BKN

Lab No : 91806 Matrix: Aqueous

Sample ID: **31-19** Sampled: **9/12/2017 7:25**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	7.29	μg/L	0.513	1	09/14/17 00:50	BKN	EPA-200.8	

Lab No: 91807 Matrix: Aqueous

Sampled: 9/12/2017 7:26

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	592	μg/L	0.513	1	09/14/17 00:55	BKN	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL



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Tioga Environmental Consultants

Mr. Luke Hall

357 North Main Street Memphis , TN 38103 Project 31-All

Information: Project #24816.01

Report Date: 9/14/2017

Report Number: 17-255-0249 REPORT OF ANALYSIS Received: 9/12/2017

Lab No: 91808 Matrix: Aqueous

Sample ID: **31-21** Sampled: **9/12/2017 7:37**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 58.1 μg/L 0.513 1 09/14/17 00:59 BKN EPA-200.8

Lab No: 91809 Matrix: Aqueous

Sample ID : **31-22** Sampled: **9/12/2017 7:40**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 0.558 μg/L 0.513 1 09/14/17 01:38 BKN

Lab No : 91810 Matrix: Aqueous

Sample ID: 31-23 Sampled: 9/12/2017 7:41

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 0.859 μg/L 0.513 1 09/14/17 01:43 BKN

Lab No: 91811 Matrix: Aqueous

Sampled: **9/12/2017 7:45**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	0.909	μg/L	0.513	1	09/14/17 01:48	BKN	EPA-200.8	

Qualifiers/ Definitions

DF

Dilution Factor

MQL



Signature: Danyale Love

2790 Whitten Road, Memphis, TN 38133 Main 901.213.2400 ° Fax 901.213.2440 www.waypointanalytical.com

Cooler Receipt Form

Customer Number: 06510

Customer Name: Tioga Environmental Consultants

Report Number: 17-255-0249

Shipping Method

○ Fed Ex	O US Postal	() L	ab		Other:	
UPS	Client	○ c	Courier		Thermometer ID:	na
Shipping conta	iner/cooler uncomprom	ised?	•	Yes	○ No	
Number of coo	lers received			1		
Custody seals i	intact on shipping conta	iner/cool	er?	Yes	○ No	Not Required
Custody seals i	ustody seals intact on sample bottles?				○ No	Not Required
Chain of Custo	dy (COC) present?		•	Yes	○ No	
COC agrees wi	ith sample label(s)?		•	Yes	○ No	
COC properly of	completed		•	Yes	○ No	
Samples in pro	per containers?		•	Yes	○ No	
Sample contain	ners intact?			Yes	○ No	
Sufficient samp	ole volume for indicated	test(s)?		Yes	○ No	
All samples rec	eived within holding tim	ne?	•	Yes	○ No	
Cooler tempera	ature in compliance?		•	Yes	○ No	
	s arrived at the laborato considered acceptable egun.			Yes	● No	
Water - Sample	e containers properly pr	eserved	•	Yes	○ No	○ N/A
Water - VOA vi	als free of headspace		\bigcirc	Yes	○ No	● N/A
Trip Blanks rec	eived with VOAs		\bigcirc	Yes	○ No	● N/A
Soil VOA metho	od 5035 – compliance o	riteria m	et 🔘	Yes	○ No	● N/A
High concer	ntration container (48 h	r)		Lo	w concentration EnC	Core samplers (48 hr)
High concer	ntration pre-weighed (m	ethanol -	14 d)	_ Lo	w conc pre-weighed	vials (Sod Bis -14 d)
Special precau	tions or instructions inc	luded?	\bigcirc	Yes	● No	
Comments:						

Page 8 of 11

Date & Time: 09/12/2017 13:57:52



Kit ID: 0000085992
Initiated By: Andy Parrish
Initiated Date: 9/8/2017
Project Comment

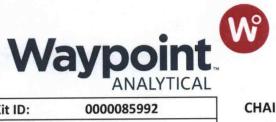
CHAIN-OF-CUSTODY



Tioga Environmental Consulta 31-All 17-255-0249 06510 09-12-2017 13:51:59

Company	Name	Company Numbe	er	Client P	roject N	/lanager/ contact	=		
Tioga Enviro	onmental Cons	ultants 06510	1	Mr. Luke	Hall				
Site Name	1- AII	Project Number		Spec		tional charges apply described the street of	21/1/2	Courier Other	UPS USPS
LIMS Proje	ect ID	Project Manager	Phone #		_	er Email		Site/Facilit	
		(901) 791-2432		edou Ihall@tic		trogaenu.com	n	248	316.01
Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Pres	ervation	Analyses
9/12/17	5:50	131-1	Aqueous		1	Plastic - Pint	١	NONE	Total Lead/DW
1	5:55	#31.2	Aqueous		1	Plastic - Pint	ı	NONE	Total Lead/DW
	5:58	31-3	Aqueous		1	Plastic - Pint	1	NONE	Total Lead/DW
	6:00	31-4	Aqueous		1	Plastic - Pint	1	NONE	Total Lead/DW
	6:03	31-5	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:05	31-6	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:14	31-7	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
V	6:20	31-8	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW

	For Laborator	ry Use Only	Sampled by (Name - Print)	Client Remarks	1. 11	
Ice Y(N	Custody Seals Y/N	Lab Comments	Relinquished by: (SIGNATURE) Relinquished by: (SIGNATURE)	Date Time 9/2/17 10:10 Date Time	Received by: (SIGNATURE)	Date Time
Blank/Co	oler Temp		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	12/17 12/17



Kit ID:	0000085992
Initiated By:	Andy Parrish
Initiated Date:	9/8/2017
Project Comme	ent

CHAIN-OF-CUSTODY



Tioga Environmental Cons

17-255-0249 06510 09-12-2017 13:51:59

Company Name			Company Number		Client Project Manager/Contact				Purchase Order Number	
Site Name Pr			06510	Mr. Luke Hall RUSH – Additional charges apply Special Detection Limits(s) Date Results Needed Project Manager Email				Method of Shipment Fed Ex UPS USPS Courier Client Drop Off Other Site/Facility ID #		
			Project Number 24814.0							
Date	Date Time Sa		Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type		servation	Analyses
	6:24	31-	9	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:25	31-	10	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:28	31-	(I	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:30	31-	12	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:35	31-	13	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:37	31-	14	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:40	31-	15	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
	6:45	31-	-16	Aqueous		1	Plastic - Pint		NONE	Total Lead/DW

	For Laborato	ry Use Only	Sampled by (Name - Print)	Client Remarks/Comments	TIT
Ice	Custody	Lab Comments	M. Strom	Sec hour	TURE) Date Time
VN)	Seals Y/N		Relinquished by: (SIGNATURE)	Date Time Received by: (SIGNA	TURE) Date Time
			Relinquished by: (SIGNATURE)	Date Time Received by: (SIGNA	TURE) Date Time
Blank/Co	oler Temp		Relinquished by: (SIGNATURE)	Date Time Received by: (SIGNA	TURE) Park Time /12/17



Kit ID: 0000085992 Initiated By: **Andy Parrish** Initiated Date: 9/8/2017 **Project Comment**

Blank/Cooler Temp

CHAIN-OF-CUSTODY



Time

Received by: (SIGNATURE)

Date

06510 09-12-2017 13:51:59

Company N	ame	Company N	umber	Client	TOJECT	manager, comes		
Tioga Enviror	nmental Consu	ultants 06510		Mr. Luke	e Hall			
Site Name Project Num 31-A11 248		nber 716.01	RUSH – Additional charges apply Special Detection Limits(s) Date Results Needed			Fed Ex	Method of Shipment Fed Ex UPS USPS Courier Client Drop Off Other	
LIMS Projec	t ID	Project Mai (901) 791-24	nager Phone #		wis@	ger Email Hoggenv.com	Site/Facil	ity ID #
Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
9/12/17	6:50	31-17	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	7:10	31-18	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	7:25	31-19	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	7:26	31-20	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	\$7:37	31-21	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	7:40	31-22	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	7:41	31-23	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
ď	7:45	31-24	Aqueous		1	Plastic - Pint	NONE	Total Lead/DW
	F1-b	a. Hea Oah	Sampled by (Name -	Print)	-	Client Remarks/Com	ments	
For Laboratory Use Only Ice Custody Lab Comments		M. Strom			24 hour		+1-	
N/N)	Seals Y/N		Relinquished by: (SIC	bor	_	Date Time Reve	eived by: (SIGNAT	9/2/17/010

Relinquished by: (SIGNATURE)